

NATURAL RESOURCES CONSERVATION SERVICE-NEW JERSEY

NEW JERSEY

CONSERVATION PRACTICE STANDARD

COMPOSTING FACILITY

(No.)

CODE 317

DEFINITION

A facility to process raw manure or other raw organic by-products into biologically stable organic material.

PURPOSES

To reduce the pollution potential of organic agricultural wastes to surface and ground water.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

- Organic waste material is generated by agricultural production or processing;
- Yard trimmings, including leaves, grass trimmings, and brush, are composted and utilized on farm as a soil amendment;
- There is a need to improve air quality by reducing emissions of odorous gasses,
- A composting facility is a planned and operated component of an agricultural waste management system; and,
- A composting facility can be constructed, operated and maintained without polluting air and/or water resources.

CRITERIA**General Criteria Applicable To All Purposes**

Laws and Regulations. The installation and operation of the composting facility shall comply with all federal, state, and local laws, rules, and regulations.

Safety. Safety and personal protection

features and practices shall be incorporated into the facility and its operation as appropriate to minimize the occurrence of equipment hazards and biological agents during the composting process.

Facility Siting. Composting facilities shall be located no closer than 50 feet from any property line and no closer than 150 feet from any area of human occupancy. No part of the facility shall be located within a flood plain unless protected against the 100 year flood event.

The bottom elevation of the composting facility shall be above the seasonal high water table and on soils with an acceptable permeability that does not allow materials to contaminate the ground water, and meets all applicable regulations, or the facility shall be installed on concrete slabs or other appropriate liners.

Locate compost facilities so prevailing winds and landscape elements such as building arrangement, landforms, and vegetation minimize odors and protect the visual resource.

Direct surface runoff away from the compost facility. Measures shall be designed to divert runoff from a 25 year, 24 hour storm event. Direct contaminated runoff from compost facilities to an appropriate storage or treatment facility for further management.

Facility Type. Selection of the composting facility/method shall be based on the availability of raw material, the desired quality of final compost, equipment, labor, time, and land available.

Facility structural elements such as permanent bins, concrete slabs, and roofs shall meet the requirements of Conservation Practice Standard 313, Waste Storage Facility. Internal

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

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lateral pressures used for design may be reduced to the bulk density value of the compost mix where appropriate.

Facility Size. Size the compost facility to accommodate the volume of waste to be treated and volume of amendments required for the expected composting period. Areas shall be added as required for staging, storing, operating, and curing functions.

Dimensions selected for elements of the compost facility shall accommodate equipment used for loading, unloading, and aeration.

Sizing of facilities for composting dead animals shall be based on normal mortality loss records for the operation. If records are not available, locally established mortality rates for the type of operation shall be used.

Compost Mix. A compost mix shall be developed that encourages microbial decomposition and avoids nuisance odors. For manure composting, the initial mix shall result in a Carbon to Nitrogen ratio between 20:1 to 40:1. Compost with a greater carbon to nitrogen ratio can be used if nitrogen immobilization is not a concern. For dead animal composting, the C:N ratio shall be between 13:1 and 15:1. For leaf composting, an initial C:N ratio of 60:1 is acceptable without amendments to adjust the nitrogen content. The moisture content of the initial mix shall be between 40 to 60 percent and pH between 5 and 9.

Additional Criteria for Static Pile and Windrow Facilities

Soils. Soils within composting areas shall have slow to moderate permeability to minimize seepage of dissolved substances into the soil profile and movement toward groundwater. The seasonal high groundwater level shall be at least two feet below the subgrade of all staging, composting, curing, and storage areas.

Compost Pad. Composting operations shall be performed on a firm, well graded surface to minimize the collection of runoff and leachate. Surface grades shall be no flatter than one percent with a recommended maximum grade of ten percent.

Evaluate site paving needs in terms of effects of equipment on trafficability, soil compaction, and potential for contamination from compost and petrol products. Graded gravel or other surface paving shall be used where compaction of on-site soils alone is not sufficient to resist rutting from equipment operation. Bituminous paving is to be avoided unless the composting material is placed over a one foot thickness of stabilized compost or other acceptable material.

CONSIDERATIONS

Develop an initial compost mix with a Carbon to Nitrogen ratio of at least 30:1 to reduce most offensive odors.

Minimize odors and nitrogen loss by selecting carbonaceous material that, when blended with the nitrogenous material; provides a balance of nutrients and porous texture for aeration.

A chemical neutralizing agent should be used if structural components do not provide adequate odor reduction.

Maximize solar warming by aligning piles north to south configured with moderate side slopes.

In humid areas, do not locate piles (windrows) across the slope to prevent ponding and soginess.

Protect compost facilities from the wind in cold climates. Wind protection may help prevent excess drying of the compost in dry climates.

In high precipitation areas, consider covered facilities to prevent excess moisture from accumulating in the compost.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

OPERATION AND MAINTENANCE

Plan. A written operation and maintenance plan shall be developed with the full knowledge and input of the owner-operator

and shall be included with the documents provided to the owner-operator. As a minimum the plan shall detail mix proportions, moisture content and temperature to be achieved, schedules for aeration/turning the material, identification of the end use(s) of the finished compost, and health and safety precautions.

Compost Mix. Loading or initial mixing of raw materials should follow the prescribed mix and procedure. Additional water, if required, should be added during the mixing and loading operation.

Carbon Source. A dependable source of carbonaceous material with a high carbon to nitrogen ratio (C: N) shall be stored and available to mix with nitrogen rich waste materials.

Bulking Materials. Add bulking materials to the mix as necessary to enhance aeration. The bulking material may be the carbonaceous material used in the mix or a non-biodegradable material that is salvaged at the end of the compost period. If a non-biodegradable material is used, provision shall be made for its salvage.

Moisture Level. Provision may be made for maintaining adequate moisture in the compost mix throughout the compost period. The moisture content of the blended material at the start of the composting process should be approximately 60 percent and should be maintained between 40 and 60 percent during the composting process.

Temperature of Compost Mix. Manage the compost to attain and then maintain the internal temperature for the duration required to meet management goals. Normal operating temperature of the composting material should be between 110 to 150 degrees Fahrenheit.

When the management goal is to reduce pathogens, the compost shall attain a temperature greater than 130°F for at least 5 days as an average throughout the compost mass.

This temperature and time criterion may be achieved during either primary or secondary composting stages or as the cumulative time of greater than 130°F in both stages.

Closely monitor temperatures above 165 degrees Fahrenheit. Take immediate action to cool piles that reach a temperature of 185 degrees Fahrenheit.

Turning/Aeration. The frequency of turning/aeration shall be appropriate for the composting method used, and to attain the desired amount of moisture removal and temperature control while maintaining aerobic degradation.

Compost Period. Continue the composting process long enough for the compost mix to reach the stability level where it can be safely stored without undesirable odors. It shall also possess the desired characteristics for its use, such as lack of noxious odor, desired moisture content, level of decomposition of original components and texture. The compost period shall involve primary and secondary composting as required to achieve these characteristics.

Test the finished compost as appropriate to assure that the required stabilization has been reached.

Use of Finished Compost. Land application of finished compost shall be in accordance with Conservation Practice Standards 590, Nutrient Management, and 633, Waste Utilization.

The operation and maintenance plan shall state that composting is a biological process. It requires a combination of art and science for success. Hence, the operation may need to undergo some trial and error in the start-up of a new composting facility

REFERENCES

Northeast Regional Agricultural Engineering Service, Cooperative Extension "on-Farm Composting Handbook", NRAES-54.